

DISEASES of the CHEST

Published Monthly by the Federation of American Sanatoria

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NOTICE: Annual Meeting of the Federation of American Sanatoria at
Ambassador Hotel, Kansas City, Missouri, May 11-15, 1936

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DISEASES OF THE CHEST

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FOREWORD

This issue of DISEASES OF THE CHEST carries Missouri's message to the members of the FEDERATION OF AMERICAN SANATORIA and to the thousands of physicians who read this journal each month. It is the hope of the Committee on Arrangements under whose supervision this edition was arranged that the papers written especially for this issue and the other data contained here, will present a picture of what Missouri is doing in combating tuberculosis.

A program of the activities of the FEDERATION OF AMERICAN SANATORIA at the Kansas City meeting will be found elsewhere in this journal and it is the hope of the Committee on Arrangements that the physicians attending this meeting will participate in all of the activities planned by the committee.

W. W. BUCKINGHAM, M. D.
Chairman

Editorial Comment

Missouri Issue THE Editorial Board of DISEASES OF THE CHEST is dedicating this issue to the physicians of the state of Missouri. They will be hosts to the Federation of American Sanatoria in Kansas City, May 11th to 15th.

We are delighted to extend this courtesy, and are proud, indeed, to present herewith articles by a few of the nationally known authorities who have pioneered in the fight against tuberculosis in the state of Missouri. These articles are all in keeping with the policy and aims of the FEDERATION OF AMERICAN SANATORIA and DISEASES OF THE CHEST, that is, to present interesting, non-technical treatises which will be helpful to

all physicians in the general practice of medicine, such as, Early Diagnosis, Case Finding, Modern Treatment, both for incipient and far advanced cases, Complications of Pulmonary Tuberculosis, Diseases of the Lungs simulating tuberculosis, etc. Each of these has its place in the propagation of the modern concepts of chest diseases.

It is our belief that such knowledge of tuberculosis should be kept working *through the physician.*

We wish to thank those physicians of the state of Missouri who have so kindly co-operated in making the Missouri issue of DISEASES OF THE CHEST interesting and helpful.

C. M. H.

President's Message

With the meeting to be held in Kansas City on May 11th, the FEDERATION OF AMERICAN SANATORIA will have passed its first birthday. I want to express to all the members of the various committees my appreciation for the help they have given me as their first President. I feel we are very much to be congratulated on the showing made. It was not easy to bind together a new organization of national scope; however, this was made possible largely because of the principles of the Federation as decided upon at the meeting last August in Albuquerque, New Mexico.

The founders of the FEDERATION OF AMERICAN SANATORIA were very farsighted and possessed of a vision. I know of no other organization that is stressing the importance of early diagnosis to the family physician. It must be remembered that the family physician forms the first line of defense and if we can make him tuberculosis minded, as the efforts of Dr. Bloodgood and his co-workers have made them cancer minded, most of the battle against the tubercle bacilli will be won. This principle, I believe, is the reason for the life of our organization.

We made a most noteworthy step when a number of our members voiced their desire to the American Medical Association for a section on tuberculosis; this section to be a part of the parent organization. I want to emphasize the importance of a full membership at this meeting. I see it as the crucial session of the FEDERATION OF AMERICAN SANATORIA. If we can show just cause for this section, I am convinced that the American Medical Association will give it a permanent part on the program. While we have our National Tuberculosis Association, we realize very few physicians attend this meeting unless they are interested in our subject.

It is our hope that we can convince enough men, at the Section given to us in Kansas City, of the importance of our subject; that they may express a desire for the continuation of this Section at the future meetings of the American Medical Association. This, however, will not be done unless you show by your presence and interest that you believe it important.

Doctor A. J. Cohen, of the Educational Committee, has written to the Secretary of each State Medical Society asking them to give place at their yearly meeting for several papers dealing with tuberculosis and stressing the importance of early diagnosis. I believe this also can be made a regular part of such meetings. We have heard from most of the Secretaries telling us of their co-operation.

I predict for the FEDERATION OF AMERICAN SANATORIA a long and useful life. I am looking forward with much pleasure to seeing each member at Kansas City. Remember we depend on you and remember we cannot do without you.

William Devitt, President

FEDERATION OF AMERICAN SANATORIA

Allenwood, Pa.



EXECUTIVE OFFICE

STATE OF MISSOURI

JEFFERSON CITY

GUY B. PARK
GOVERNOR

April 9, 1936

Committee on Arrangements
Federation of American Sanatoria
Kansas City, Missouri

Dear Doctors:

I am informed that the Federation of American Sanatoria is meeting this year at Kansas City, Missouri, May 11 to 15. I am further informed that in conjunction with this meeting, the official publication of the Federation of American Sanatoria, known as "Diseases of the Chest", is being dedicated to the State of Missouri, and it will portray through the printed word and by picture, the progress made by the State of Missouri in the fight against tuberculosis.

I deem it a privilege and a pleasure to express through the pages of this Missouri edition of "Diseases of the Chest" my best wishes to the editors, the Committee on Arrangements and to the physicians throughout the State of Missouri for the success of their meeting.

I extend a cordial welcome to visiting members of the Federation of American Sanatoria and may your stay at Kansas City be an enjoyable one.

Very truly yours,
GUY B. PARK
Governor

Adult Pulmonary Tuberculosis: Early Diagnosis

RECENT GAINS in our knowledge of tuberculosis show that the disease in most cases is truly incipient for many years before the manifestations of adult tuberculosis occur. Hence, the term "early diagnosis" correctly applied would refer to the diagnosis of childhood type tuberculosis. This diagnosis is best made by means of careful history, tuberculin test, and radiographic examination. For the purpose of this paper, however, the term "early diagnosis" will be used to apply to the earlier manifestations of the tertiary or adult type of infection.

History—In the diagnosis of tuberculous toxemia accompanying adult type tuberculosis, history is very important. The characteristic story consists of a triad of three couplets:

- Cough and expectoration.
- Fever and tachycardia
- Loss of weight and strength.

When these symptoms are definite and persist over a period of several months the diagnosis of tuberculosis is definitely indicated unless the symptoms can be explained by some other disease.

The statement of the patient concerning fever and tachycardia should not always be accepted at face value for it is often necessary to use the thermometer several times a day over a period of some days to establish whether or not fever is present.

Loss of weight is considered definite when the patient has lost five percent or more of his normal body weight within three months or less.

Additional symptoms which may appear in the history and are strongly indicative of tuberculosis are hemoptysis (expectoration of a dram or more of bright red blood followed for some hours or days by blood-streaked sputum), night sweats, pleurisy with effusion, spontaneous pneumothorax, and pain in the lat-

BY
SAM H. SNIDER, M.D., F.A.C.P.
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eral regions in the chest. It must be remembered that tuberculosis frequently occurs without

producing definite pain, especially if the pleura is not involved. Care should be taken to distinguish between the lateral chest pains of pleurisy and the centrally located pains of tracheitis, cardiac disease, and aneurysm.

Altogether, the importance of history in the diagnosis can hardly be over emphasized.

Physical Examination—Physical examination is of great value only if it shows positive physical findings indicative of pulmonary disease. Among these are unilateral muscle atrophy above or below the clavicles and particularly about the insertion of the sterno-cleido-mastoid at its attachment to the sternum and clavicle. These differences in muscle tension are more readily seen than felt and must be studied with the patient perfectly relaxed in the erect position with the light shining symmetrically on the chest. I have repeatedly been able to make a diagnosis of chronic pulmonary tuberculosis by inspection of the chest when other abnormal findings could not be elicited. Rales restricted to the upper chest and accompanied by chronic toxemia are nearly always indicative of pulmonary tuberculosis, but their absence cannot be accepted as proving the absence of disease. Likewise, the absence of dullness merely indicates that there is no massive consolidation or effusion which would produce that dullness. Hence, negative physical findings have practically no value in excluding tuberculosis.

Roentgen-Ray Examination—Every patient with a suspicious history should be studied with the Roentgen-ray to determine whether his lungs have been invaded by tuberculosis. Infiltrations restricted to the upper half of the chest

and accompanied by chronic toxemia are nearly always due to tuberculosis. On the other hand, infiltrations restricted to the lower half of the chest are usually non-tuberculous and should not be diagnosed as tuberculous unless the sputum shows tubercle bacilli.

The Roentgen-ray is invaluable in the diagnosis of cavitation for by its use almost every cavity that is of any considerable size may be discovered, while not more than one-third of these cavities are discovered by physical examination.

It is important that the Roentgen plate be read by a man who is experienced in the interpretation of chest plates for this requires as much training as physical examination and erroneous diagnoses are frequently based on improper interpretation of the Roentgen plate. It is my opinion that the Roentgen-ray will discover at least twice as many cases of early pulmonary tuberculosis as can be discovered by physical examination. The chest clinician finds it an invaluable aid in diagnosis and in indications for treatment.

Sputum Examination — Sputum examination is of great value and should never be neglected, but we must be careful in interpreting sputum examinations that we do not make them the only basis of diagnosis. If the sputum contains tubercle bacilli the patient is practically certain to have pulmonary tuberculosis, but this finding of tubercle bacilli in the sputum should always be verified by a competent bacteriologist or a clinician who is familiar with the forms of tubercle bacilli and the methods of staining them. I have seen a diagnosis of tuberculosis made by a laboratory technician with less than two weeks experience in laboratory procedures; and the patient advised to change climate on the basis of this diagnosis, which proved to be erroneous.

We should never consider the sputum to be negative for tubercle bacilli until several specimens have been examined. I have seen a case in which tubercle bacilli

were found in the sputum only after more than fifty successive negative specimens had been examined. Concentration of the sputum by digestion and the centrifuge has aided in finding the bacilli when they were not present in great numbers; but greater emphasis should be placed on patience and persistence in the search of the smear for the organisms. If there is no ulceration present the sputum may be persistently negative for tubercle bacilli in the face of a fairly extensive infiltration and I do not consider the negative findings as having the great value which is to be attributed to positive findings of bacilli in the sputum. Bacilli in the sputum in considerable numbers usually mean that cavitation is present and this clouds the prognosis very considerably unless compression can be used.

Altogether, the two procedures which seem of greatest value in early diagnosis of adult pulmonary tuberculosis are careful history and a well made and well interpreted Roentgen-ray plate. Early diagnosis has improved greatly in the last few years but is still very important not only in saving the life of the individual but in protecting others against exposure to his infection.

Summary

1. Early diagnosis should now be changed to mean diagnosis of childhood type tuberculosis.
2. History is a very important aid in making the diagnosis.
3. Negative physical examination has little value in excluding pulmonary tuberculosis, but the presence of positive physical findings is a definite indication of disease.
4. Roentgen-ray studies carefully made and interpreted are indispensable to good work in the early diagnosis of tuberculosis.
5. Positive sputum examinations usually indicate an ulcerative process while a great many negative specimens are necessary for the exclusion of pulmonary tuberculosis.

Complications in Pulmonary Tuberculosis

TUBERCULOSIS, like syphilis, may involve practically any organ or tissue of the body. Since one of the

commonest sites of primary infection is the lung, tuberculosis, in any other part of the human body, may be considered a complication of pulmonary tuberculosis.

Pleurisy is one of the most common of its complications. Not infrequently the symptoms of pleurisy are the first to attract the attention of the patient or the doctor to the possibility of lung involvement. The commonest form is the dry adhesive form of pleurisy. Tubercles involve the pleura and, exudate which sticks the two pleurae together, becomes organized and thus firm adhesions are formed. The pleura may be involved in any part of the chest but is most commonly involved in the upper third of the lung. The discomfort is frequently of an aching character but at times may be very severe. Aching about the shoulders is commonly complained of. One must not overlook the fact however, that the pleurisy may involve the diaphragm and result in puzzling referred pains to the shoulder and neck or to the abdomen.

Thickened pleura and adhesions to the diaphragm can frequently be visualized by the Roentgen ray and if a partial pneumothorax exists, adhesions in other parts of the chest also. All methods of physical diagnosis must frequently be called into action to make the diagnosis. If the pleurisy is sufficiently acute and localized, immobilization with adhesive straps may be very effective. Otherwise, symptomatic treatment and the general care for any tuberculous lesion is indicated.

The acute type of pleurisy presents a very different picture. The fever frequently is very high, sometimes ranging above 105°. Other signs of toxicity are present and marked asthenia and very rapid emaciation occur. Very soon indications of an effusion appear and with the appearance of this the patient gets

BY

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relief from the severe pain. The effusion may fill only a part of the chest or it may fill the entire chest.

If there hasn't been an associated activation of a pulmonary tuberculous lesion, after a few weeks, the symptoms gradually subside and the effusion is usually absorbed. Tubercle bacilli may or may not be found in the straw colored fluid. However, before giving up the search, a guinea pig inoculation or culture should be made. If the effusion results in such disturbing symptoms as dyspnoea and cardiac embarrassment, it should be aspirated, otherwise one need not interfere, except for diagnostic thoracentesis.

Not infrequently an attack of pleurisy as I have just described is the first warning of the patients pulmonary tuberculosis and if no other cause for the effusion can be found even though tubercle bacilli are not found in the fluid and a parenchymal lesion cannot be found in the lung, it is best to treat these patients with prolonged bed rest as though we were sure we were dealing with a tuberculous lesion. Statistics show that a high percentage of such cases do eventually come down with pulmonary tuberculosis.

Purulent effusions occur most frequently with pneumothorax. It is especially likely to follow a spontaneous pneumothorax when the pleural space becomes contaminated with air and secretions from the bronchi.

It may, however, occur without a pneumothorax. A tuberculous empyema may follow an extensive tuberculosis of the pleura. Tuberculous patients are liable to non tuberculous respiratory infections during epidemics and may develop a non tuberculous empyema without lung rupture.

Tuberculous empyema are of two distinct types. In the one, symptoms may be very few or almost entirely absent. In the other, the patient is very toxic and

rapidly loses ground. Patients with the non-toxic type may carry the pus for years without serious symptoms.

Empyema whose bacterial flora is non tuberculous also vary in the degree of toxic symptoms produced according to the virulence of the causative bacterium but as a whole, cause more severe toxicity. Treatment varies from simple aspirations to the most radical surgery depending on the type of infection. A further discussion of treatment cannot be attempted in so limited a paper as this.

Spontaneous pneumothorax frequently complicates tuberculosis of the lung. It also is often the first important indication of lung involvement. It should always remind one of this possibility and cause one to make a diligent search for pulmonary tuberculosis. There are however other causes of spontaneous pneumothorax and we know today that this accident does not justify a diagnosis of pulmonary tuberculosis if all other evidence is wanting.

The immediate treatment is directed against shock and if the heart and respiration are much embarrassed, air must be removed. We must remember, however, that the chest will soon fill again and air removal is only a temporary expedient to allow the patient time to adjust to the pressure. Sometimes the case demands that an open canula be left in the chest wall. This, however, is likely to result in a serious empyema and should be reserved only for a last resort. Spontaneous pneumothorax is a very serious complication and frequently proves fatal.

If empyema supervenes it must be treated as the virulence of the infection indicates.

Tuberculous laryngitis is almost always secondary to pulmonary tuberculosis. Its incidence statistics vary from 5% to 50% probably depending mostly on the extent and virulence of the pulmonary condition and the zeal with which the physician searches for it in his patients. While a laryngeal involvement adds much gravity to the prognosis, it by no means

spells a hopeless prognosis as was formerly thought. It usually progresses as the lung condition progresses and improves as that condition improves. Therefore, the first consideration in treatment involves those measures of rest and general hygiene employed in pulmonary tuberculosis. Voice rest should be advised and in cases with severe ineffectual coughing, measures should be instituted to control this as severe coughing certainly is not conducive to lung or laryngeal rest. The number of antiseptics used by different men evidences their lack of specificity. Some men report rather good results with local ultraviolet therapy. We use it extensively at Koch Hospital and believe it at least makes for greater comfort for the patient. Benefit from the actual cautery if properly used is claimed by many. It must be used cautiously and should be avoided in acute toxic cases.

Relief of pain sometimes becomes a very vexing problem. Such drugs as Orthoform and Anesthesin may be helpful. Cocaine is often needed. Blocking of the superior laryngeal nerve will give relief in many cases.

Tuberculosis of the intestinal tract is a very common serious complication of Pulmonary Tuberculosis. As in the case of laryngeal tuberculosis, it was formerly thought to render the prognosis practically hopeless. We know today, however, that many tuberculous ulcers of the intestine do heal and that if the pulmonary condition is controlled, the intestinal lesions in many cases will heal. We have many cases on record at Koch Hospital who recovered from their intestinal tuberculosis when they overcame their lung condition. I have in mind one patient who had a basal pulmonary tuberculosis, developed a spontaneous pneumothorax, a tuberculous empyema and enteric tuberculosis. Her empyema was replaced by oil, her pneumothorax overcame the pulmonary tuberculosis and with ultra violet and other therapy, her intestinal tuberculosis healed and she has been clinically well for several years.

As to the diagnosis of enteric tuberculosis, it is necessary for us to use all aids at our disposal. Some workers are very enthusiastic about the value of x-ray and others feel it isn't a very valuable aid. Its value, as is the case with many other diagnostic aids, is directly proportional to the care and industry with which it is employed. The symptoms which consist of pain and tenderness especially in the caecal region where most ulcers occur, gaseous distension, an-orrhea, increased peristalsis with diarrhoea or diarrhoea alternating with constipation are a great aid and usually taken with the x-ray findings will make the diagnosis. Although the most effective treatment for enteric tuberculosis is that directed against the pulmonary lesion which is its source, nevertheless, ultraviolet therapy and a diet rich in vitamins A and D, as cod liver oil and tomato juice, frequently are very beneficial and at times appear to act almost specifically. Coarse foods leaving an irritating residue should be avoided and constipation treated dietically and with mineral oil.

Tuberculosis of the kidney is by no means an uncommon complication of pulmonary tuberculosis. In advanced cases symptoms resulting from ureter obstruction or bladder irritation are common, but in a tuberculosis institution, a careful check of the urine followed by cystoscopic examination when indicated will find some practically silent or symptom free cases.

I believe the best opinion still holds that given a unilateral tuberculosis of the kidney, nephrectomy is the treatment of choice provided the pulmonary condition is not so bad as to contra-indicate it. Helio-therapy is praised by some phthisiologists as very helpful and should be tried. As with other complications, it is of utmost importance to treat the source of the trouble in the lung or wherever it be.

Secondary infection of the vas-deferens and epididymus are not uncommon complications of pulmonary tuberculosis.

One must always keep in mind that tuberculous meningitis and generalized tuberculosis result more frequently from surgery for tuberculosis of these organs than from surgery on tuberculous lesions elsewhere when deciding whether or not to interfere surgically. Ultra-violet therapy may be very beneficial for tuberculous sinuses from these organs. Surgical excision may be advisable but one must weigh carefully all considerations in each individual case before deciding upon an epididymectomy or vasectomy.

Generalized miliary tuberculosis and tuberculous meningitis are complications resulting from rather large doses of tubercle bacilli being liberated in the blood or lymph stream as when a caseous gland or caseous lesions elsewhere rupture into a blood vessel. The prognosis is very grave and in the case of tuberculous meningitis practically hopeless. It occurs much more frequently in children and young adults. Since very little can be done in the way of treatment other than symptomatic and supportive treatment, our greatest efforts should be expended on prophylaxis, caution must be exercised in surgery and the handling of accidents involving tuberculous foci.

Gangrene of the lung sometimes occurs as a complication of pulmonary tuberculosis. When one considers the mass of non-tuberculous secondary infection in a lung with extensive tuberculosis, it is surprising that it does not occur more frequently. It is usually easily recognized by the extremely septic condition of the patient plus the very fetid odor of the breath and sputum. While fetid sputum does not always mean gangrene, yet the picture of shock and extreme sepsis together with the fetid sputum rarely leaves much doubt as to the diagnosis. Certain types of spirochete and fusiform bacilli found in pyorrhoea and other mouth conditions are frequently associated with lung gangrene and perhaps are frequently the causative factor.

We must not overlook the fact that a pulmonary tuberculosis may be the pre-

(Continued to page 34)

The Use of the Tuberculin Test In Private Practice

A FEW YEARS AGO the tuberculin test was practically abandoned. It was considered of no value except when negative and only in the age group below ten was it negative often enough to differentiate. The extensive surveys that have been made during the last fifteen years have shown that it does possess much value. If it is of value in group surveys it must be of value in general practice.

Of the various ways of getting tuberculin into contact with deeper layers of the skin, the intradermal injection of tuberculin dilution is the surest and best. This test is called the Mantoux. The Von Pirquet, or scratch method, is not quite as good as the Mantoux.

The materials in use vary. The physician who makes only an occasional test will find it better to use the scratch Von Pirquet method of test, using concentrated Old Tuberculin which does not deteriorate very quickly. If a large number of tests are to be made, dilutions of old tuberculin can be prepared. Stock preparations can be purchased from pharmaceutical houses. These consist of measured amounts of O. T. undiluted and vials of diluent. Using this set, a series of dilutions can be prepared. For the first test use a 1-10,000 dilution. Inject 1/10 of a c.c. of the dilution, containing 1/100 mg. of O.T. If this is negative, repeat, using 1-100 dilution, 1/10 of a c.c. containing 1 mg. of O.T. If only one test can be made, use 1-1000 dilution, 1/10 of a c.c. containing 1/10 mg. The test is read 48 hours after injection. The area of edema is measured and the test is recorded in terms of 1,2,3,4 plus. Roughly this corresponds to the diameter of the edematous area in centimeters, except that a 4 plus reaction is one in which blister or necrosis occurs. No control is necessary. A new material, Purified Protein Derivative, has the advantage of greater uniformity, but is more expensive

BY
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than Old Tuberculin and, I believe, has little or no practical advantages.

A positive tuberculin test means former infection by the tubercle bacillus. Types of bacilli are not differentiated e.g. human and bovine types react to either tuberculin. It does not give any information as to severity of infection, activity of lesion, length or time of infection or the prognosis. This test tells us one thing, and that is, that at some previous time tubercle bacilli of some type have entered the body. There is no other way to tell positively when infection has occurred. There are no signs or symptoms that can be depended upon to tell us when bacilli first gain entrance to the body or even to call attention to their presence. The tuberculin test does reliably divide our patients into two groups, the infected and non-infected. It is the best way to quickly screen out the tuberculous from the non-tuberculous.

A negative test is evaluated as either false or true. False negatives are those in which the testing material is too weak or not good, the period of incubation has not elapsed, or the patient is so ill that allergy is depressed. This latter may be due to tuberculous infection or to other infections such as measles. Remedies for false negatives are to use good material, and if dilutions are used, make up fresh ones every month. Always retest every negative patient six months or a year after the first test. If the patient is overwhelmed by a tuberculous infection, other methods of diagnosis are available. Should other infections be present, retest when patient has recovered. The negative tests mean the patient has never been infected by the tubercle bacillus or that the infection has healed so well that allergy is no longer present. We see many patients, especially adults, that are negative to small doses of tuberculin and yet have calcified areas in the lungs. These patients usually

react to larger doses. Very few patients will be found that have healed their first infection and are tuberculin negative.

In large surveys, a group is assembled and every one in the group is tested. In private practice one can do the same thing or can discriminate a bit. Eventually, I believe, we will do tuberculin tests as routinely as we do Wasserman tests, or blood counts, etc. It has long been known that the closer the contact to a source of bacilli the more liable is infection. A carefully elicited history will reveal absence or presence of contact and tests may be made only on contacts. Surveys have shown that a very large number of cases occur in persons who say they have no knowledge of any previous contact. It seems to me that the only thing to do is to use the test routinely, even in private practice. Although it is best to do routine tuberculin tests at all ages, the interpretation of the results and the follow up must vary according to the age.

The first group is from birth to about age three. There are two ways of attacking this problem. First there is the test of the parents of which more will be said later. The time will surely come when each father and mother will know positively whether or not they are or may likely become a source of infection for their children. At present, the door is usually locked after the horse is gone, e.g. after the child dies of tuberculous meningitis. The parents are then examined and one or both found to have a chronic proliferative pulmonary tuberculosis. Careful examination sooner would have saved the child's life.

The second attack is by way of the child. Making routine tuberculin tests, the pediatrician or family physician discovers the child to be a positive reactor. A child infected before age three usually becomes so from some one close at hand; relative, servant, or intimate family friend. The positive reaction calls for a careful inspection of these close contacts; tuberculin tests first, followed by films of the positive reactors. We strongly advise

every family employing domestic help to have these employees examined. This is seldom done. Many tuberculous women, some knowing that they are tuberculous and some not, seek employment caring for children. The only way employers can protect themselves is to have the prospective employee examined thoroughly and to pay for this examination. The money they spend may be saved a thousand fold.

At one time it was considered that children infected below age three had a very unfavorable prognosis. This is certainly far from the truth. Tuberculous children, from birth to age three, fall into two groups. The first group is composed of those obviously ill with acute types of the disease. For them the prognosis is extremely unfavorable and when tested with tuberculin, they are often negative. The disease is so overwhelming that allergy is depressed. The second group react to tuberculin, yet appear to be normal children. For this group the immediate prognosis is very good. As a rule, the first infection proceeds to heal by resolution, calcification, localization and ossification.

The next age group is three to puberty. The number of children found to be infected in middle western states varies according to locality but is seldom over 25% and in most communities 10% or under. As the age increases, contact sources are harder to find, but should be looked for just as they were in the younger classes.

There are two reasons for looking for tuberculous infection in this second group. The first and lesser reason is to look for active cases among adult contacts. This is not so important because as age increases the child has so broadened his contacts that infection may come from extra family sources and tests have shown us that we find few adult cases from testing these older children.

Second, we want to know which children have been infected so that an attempt can be made to protect them against adult types of this disease. To date no one is exactly sure how to do this. At present, many of these children are cared for in the open air school systems, preventoria,

etc. It is difficult to check the efficacy of this type of treatment. The proof of this form of treatment is in later life. The immediate prognosis is good. We rarely see active pulmonary tuberculosis before puberty. The few exceptions are usually in the Negro, Mexican or Indian. Children of this group seem to handle the first infection very well. The future prognosis is not so rosy. Approximately 10 to 15% of these children are said to develop adult types of the disease by age 21. At the present time we have no criteria by which we can tell whether or not this or that child is liable to develop clinical disease in later life. We do not know positively whether the child must receive added or superinfection or whether a spread may occur from the first infection. While members of the profession disagree on how this second infection occurs, all agree that the second infection is dangerous because the first infection has produced hypersensitiveness against tuberculin. It is agreed that this hypersensitiveness or allergy, as it is called, has some protective powers. The exponents of vaccination, the followers of Calmette believe that there is so much value in this as a protection that they actually produce the first infection types of tuberculosis with B.C.G. It is believed by most of the American schools that B.C.G. is dangerous, that the first infection with tubercle bacilli is not a desirable thing, that it should be postponed as long as possible and that if it does give some protection, its liability is greater than its asset value. Therefore, the groups to puberty are tested in order that we may watch the infected children through the years of sexual development and early maturity, and try to prevent, if possible, adult types of the disease and failing this, to at least diagnose the infection in minimal stages.

Tuberculin testing in adult groups makes early diagnosis possible. It is true that as age advances the percentage of tuberculin reactors rises. These figures will undergo change as from year to year new generations growing up in a world of lessening tuberculosis infection come

of age. Every year the tuberculin test will become more valuable. Diagnosis of tuberculosis usually is made because the patient notices certain symptoms and comes to a physician for relief. By the time this happens the disease is usually far advanced. The new and modern way is to make a diagnosis before symptoms occur. Surveys have shown that the x-ray film is the best way to make very early diagnoses. The tuberculin test picks out the cases for X-ray. Cases diagnosed before symptoms appear are more amenable to treatment. Hospital costs are lowered to such an extent that the money saved more than pays for the many x-ray examinations.

A word of warning should be given here. Every adult tuberculin reactor certainly does not have actual clinical disease. As a matter of fact, relatively few will develop actual disease. There are many diseases that have onsets similar to tuberculosis so that a differential diagnosis is not easy. The lungs are the site of so many infections that it is almost impossible to define a normal roentgenograph of the chest. There is also a great deal of difference in x-ray equipment. The best apparatus on the market today is none too good. In spite of this films are being made with very inferior machines; films that cannot be read accurately and which may do more harm than good. It must be realized that the early diagnosis of tuberculosis is not easy, and requires a great deal of experience in film interpretation.

At the present time a committee of the National Tuberculosis Association is working to standardize equipment. A great deal of work has been done to standardize tuberculin. The Purified Protein Derivative is one answer to this. At present, it is priced too high, but greater production should reduce the price.

Summary

The tuberculin test is the most effective screen to separate non-infected from infected tuberculous patients.

The test is used in children first to ascertain infected children, and second to
(Continued to page 34)

Primary Carcinoma of the Lung

IN A RECENT PAPER C. I.

Allen (1) states that approximately one hundred and fifty papers dealing

with primary carcinoma of the lung have appeared in the literature within the past three years. A fair number of these papers have dealt with the clinical features; whereas only a short time ago most of the writers were concerned with the pathologic picture. This increased clinical interest is very evident. Reports of patients treated during the past few years have demonstrated that in some instances primary tumors of the lung are operable. There is no doubt but that the number of patients diagnosed as suffering from primary malignant disease of the lung has rapidly increased.

Graham and Singer (2) quote Jung-hams in stating that primary carcinoma of the lung, which always arises in a bronchus, constitutes between 5 and 10% of all carcinomas. Obviously these figures indicate that considerable study should be devoted to this disease in order to make an early diagnosis and to determine suitable treatment. Unfortunately, the onset in many cases is insidious, and in some cases it appears to arise in the lungs of individuals who have for many years been the victims of such chronic pulmonary diseases as bronchitis and tuberculosis. However, in others the condition arises in individuals who have a history peculiarly free from illness in any form. Furthermore, the enormous improvement in thoracic surgery justifies the hope that in the near future many patients now doomed when the diagnosis is made may be enabled to recover completely or at any rate look forward to a distinct prolongation of life.

Very little can be said in regard to etiology. Primary carcinoma of the lung is much more common in men than in women. Edwards (3) reports a series of 73 cases, 53 of whom were men and 20 women. In Edwards' (3) series the old-

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est patient was 69 and the youngest was 26 years of age. The average age was approximately 49 years.

Jackson and Konzelman (4) report a series of 32 cases, 7 males and 25 females. The average age of the men was 52.3 years and of the women 34.1 years. In the cases I have seen the average age has been low. Two females have been under 21 years of age and two men have been under 40 and none have been more than 60 years of age. The lesion was on the right side in 33 of the cases reported by Edwards and on the left side in 40 cases. In Jackson's series 23 were right and 9 left. These tumors occur more frequently in the lower lobes than in the upper lobes according to the case reports. As far as can be determined at present, occupation does not appear to be of great importance.

Edwards (3) reports that cough was present in all of the 73 cases except one. All of Jackson's and Konzelman's (4) 32 cases had cough as a predominant symptom except five. Rabin and Neuhof (5) do not report their 250 cases in detail, but state that cough and hemoptysis is caused by ulceration of tumors into the larger bronchi. Hemoptysis is reported to occur in a large proportion of all cases. Edwards (3) reports hemoptysis in 87.7% of his series. Hemoptysis, therefore, occurs in a greater percentage of cases of pulmonary malignancy than of pulmonary tuberculosis.

Sixty-four per cent of Edwards' (3) cases had a mucoid frothy sputum. If necrosis and infection has occurred the sputum may be purulent and resemble that seen in pulmonary abscess or bronchiectasis.

Dyspnoea was present in 74% of Edwards' (3) cases and he does not believe that it depends upon the amount of lung involved. He thinks it may be due to involvement of the bronchus or of the vagus. Dyspnoea in the cases I have seen

has been fairly well in proportion to the amount of lung put out of action. Rabin and Neuhoof (5) state that pain is the most common signal symptom of the tumors of the smaller bronchi while Edwards (3) reports pain as being present in only 60% of his cases. The pain is usually caused by the growth extending to the pleura or extrapleural structures.

Physical signs vary according to the location of the growth. When it is in a main bronchus to a lobe the signs will usually be those of bronchial obstruction causing atelectasis of the involved lobe. In the later stages there may be evidence of a secondary pleural effusion. The effusions are often serous early, but usually are blood stained or contain a great amount of blood. Physical signs may be absent when the growth is located in the peripheral portions of the lung or consist of slight localized dullness. In the later stages the growth infiltrates the chest wall and produces a very flat, solid percussion note—slightly different from the note over fluid; also the dullness may extend over beyond mid line, although the heart is not displaced. Clubbing of the fingers may be present.

In those carcinomas blocking the main bronchi or the commencement of the secondary bronchi the x-ray picture is dependent on the presence or absence of bronchostenosis. Infiltrations most dense at the lung root and extending in fine streaks and nodules to the periphery may be seen. Enlarged mediastinal lymph glands may be present. Growths arising outside the main bronchi may produce a well circumscribed shadow. The non-circumscribed tumors of the smaller bronchi usually present the appearance seen in unresolved pneumonia. When the growth extends to the periphery careful inspection may show more or less destruction of a rib.

Bronchography is mentioned by all authorities as being essential in the diagnosis of bronchial neoplasms. (Radiographic examination after introduction of lipiodol). It will give positive evidence of obstruction of bronchi. It will

also show partial obstruction caused by a narrowing of the bronchial lumen from either within or without.

Those who are interested primarily in the medical or surgical aspects of chest diseases seem to be as enthusiastic as the bronchoscopist as to the value of bronchoscopic examination in bronchial carcinoma. The cardinal indication for bronchoscopic examinations is clinical or roentgenologic evidence of bronchial obstruction (a wheeze or an area of obstructive atelectasis or obstructive emphysema), and in no connection is it more valuable than in the early diagnosis of bronchial carcinoma (4). Several important observations can be made by this method: 1. A definite nodular growth may be seen from which a specimen can be removed for microscopic examination. 2. Narrowing due to submucous infiltration by growth or that due to pressure by a tumor outside the bronchus may likewise be determined and 3, broadening of the carina due to enlarged mediastinal lymph glands can be visualized. Edwards (3) thinks that bronchoscopy should be performed on the majority of patients who have had hemoptysis and from whom tubercle bacilli cannot be found in the sputum, especially if they are middle aged. The same view is held by other authorities.

The introduction of air into the pleural space may help to distinguish tumors of the inner chest wall and pleura from those arising in the pulmonary tissue and, therefore, may be of considerable value if the question of operation is being considered. Thorascopy may give evidence of secondary involvement of the pleura, a condition which would contraindicate any attempt at radical operation. Pleural effusion, when present, may be examined by Mandelbaum's method and enable a positive diagnosis to be made. This method comprises separation of the cellular content of the pleural fluid by centrifugalization and hardening the deposit by formalin after which it is prepared for microscopic examination. This

method can also be used for sputum examination.

Exploratory thoracotomy may be used if all other methods do not enable a diagnosis to be made.

Much difficulty is being experienced in arriving at a practical classification of carcinoma of the lung. Formerly the classification was based on the cellular structure of the tumor. All are agreed that practically all pulmonary carcinomas originate in a bronchus and many believe that all types are derived from the same cell, namely the undifferentiated basal cell of the bronchial mucosa. All seem to believe that the location of the tumors is of great importance when treatment is considered, either radium or surgery, and therefore should be considered in classification. Tuttle and Womack (6) think their investigations show that tumors located in the large bronchi are less malignant and offer a better chance for cure by removal than those arising from the smaller bronchi. On the other hand Rabin and Neuhof (5) think their research has shown that peripherally located tumors are more likely to be circumscribed and that regional lymph nodular involvement occurs late and is limited. They, therefore, believe that the peripherally located tumors offer the best chance for surgical cure. Edwards (3) states that it is almost invariably impossible to perform a lobectomy on any patient in whom the growth can be seen with the bronchoscope; and in these cases the only radical operation that can be considered is total removal of the affected lung.

There are many pulmonary diseases which cause symptoms and objective findings similar to those of cancer of the lung. Lung abscess is often difficult to differentiate. The growth causes bronchial obstruction and infection occurs in the obstructed portion of the lung producing an abscess or gangrene. For this reason, the cause of lung abscess should always be determined if possible. Pulmonary tuberculosis is often diagnosed when a bronchial malignancy is present.

Differentiation depends on the sputum findings and if sputum is negative for acid fast organisms, a careful consideration of all subjective and objective findings is in order. As the growth may cause about the same symptoms and findings as a foreign body in a bronchus, the presence of a foreign body should always be ruled out. The acute symptoms that occur at the onset of necrosis and infection of the growth may stimulate pneumonia. A chronic bronchitis manifested chiefly by cough, especially a cough with a tendency toward spasmodic attacks may be caused by a carcinoma in a large bronchus without obstruction. The likelihood of a new growth is increased if hemoptysis is present. Positive diagnosis must necessarily depend on biopsy of a specimen obtained by the bronchoscope, biopsy of a regional lymph gland or on the operative or autopsy findings.

During the past 4 years Edwards (3) has been implanting radon seeds in bronchial tumors. The holders of radon seeds remain in place for seven days, the growth receiving an amount of gamma radiations equivalent to 1,795 milligram hours of radium. In general he states the end results as regards cure are poor owing to the late stage in which the treatment is instituted. In a large proportion of cases the local growth disappears. He thinks there is as definite a hope of curing them by irradiation as there is in early carcinoma of the tongue. He reports one patient treated by this method in 1931 who was well in May, 1934, there being a white scar on the bronchial wall where the growth was formerly located. Several patients are alive from periods of 2 months to over a year. He also inserts the radon seeds by thoracotomy in some cases when the growth is not visible through the bronchoscope.

Many cases of pulmonary malignancy have been treated by surgical removal of the affected lobe or lobes during the past few years. Edwards (3) reports 14 such removals. Rabin and Neuhof (5) report 5 cases, one of whom was living at the

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Surgery in Pulmonary Tuberculosis

A FEW YEARS ago the idea of operating for pulmonary tuberculosis in the minds of most of us

was indeed a colossal undertaking. Unfortunately, there are still a few Doctors who have not been able to accommodate themselves to this recent trend in the treatment of pulmonary tuberculosis, and these few die hards have not accepted surgery until only in the far advanced, hopeless cases, and then point their fingers to the surgeon with a great deal of smugness at the poor results obtained. This lack of understanding is due in a large measure to an improper comprehension of the meaning of surgery in pulmonary tuberculosis coupled with a poor understanding of the physiological principles involved in the treatment of pulmonary tuberculosis.

There is nothing new or startling in the treatment of pulmonary tuberculosis by surgical means. We only attempt to bring about the maximum degree of rest to the diseased lungs by the institution of surgical procedures such as the cutting of nerves, muscles, tendons and ribs to bring about relaxation and rest of a lung. These procedures can be made permanent or temporary depending upon the individual case at hand.

We have all seen cases where the inter-spaces are narrowed and ribs pulled in, diaphragm pulled up, and the heart and mediastinum pulled far into the diseased hemithorax: A NATURE THORACOPLASTY. These far advanced attempts of nature to heal by extreme fibrosis and traction are seen rather infrequently and we now do not wait for a case to become this far advanced, but institute procedures which will bring about the same desired results. For example, if we were dealing with a tuberculous joint we would immediately put it in a cast or stabilize it by some operative procedure, and not merely tell the patient to limit the use of that diseased member.

If we look upon the lung as being an

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elastic organ which is capable of changing its shape and size several times during a minute we would

realize how futile bed rest, the use of binders, shot bags and posture are in decreasing the movements in the lungs to any marked degree.

A recent check up in the more up to date, modern equipped sanatoriums showed from seventy to eighty per cent of their cases to be under some form of collapse therapy. These figures, of course, include pneumothorax. The percentage of surgical collapse cases should run from twenty to thirty per cent phrenicectomies, five to ten per cent thoracoplasties and five to ten per cent other surgical procedures or combinations of the above. We now do not wait for a case to become so far advanced that nature sets up her own collapse measure in the faint hope that this will result in a cure. We have now at our command the following surgical collapse measures and combinations of each that will early bring about a condition of collapse and rest to the affected part, the lungs.

These operations all attempt to bring about rest and may be divided into four main groups, nerves, muscles, ribs and lungs. The amount, type and degree of disease present determines which of the above will be first used.

Nerves

Phrenic

Temporary

Permanent

Intercostal

Temporary

Permanent

Muscles

Scalenectomy

Plombage

Paraffin

Pectoral muscle

Fat

Bag

Ribs Thoracoplasty

Complete 1 to 11 inclusive Antero-lateral

Partial First rib, Phrenic, Scalene,
same incision

Costectomy

Lungs

Pneumolysis

Open

Closed

Drainage of cavities

Lobectomy

General Indications—Practically every demonstrable unilateral tuberculous lesion should have some form of surgical collapse therapy and few should be left to bed rest alone. In emergencies such as severe hemorrhage, massive or repeated, it has a place. Any case that fails to show response to a reasonable period of expectant treatment should be considered for collapse. Certain types of chronic unprogressive fibroid cases, with large cavitation, may recover a fair degree of working capacity and comfort after collapse therapy. Tuberculous enteritis, laryngitis, are not contra-indications. If the primary focus can be cleared up, the above will take care of themselves.

Advantages—The advantages are self apparent. It reduces the toxemia, shortens from fifty to seventy-five per cent the period of treatment, brings about a greater degree of working capacity in a shorter time and brings about a cure more permanent and lasting than can be anticipated under other measures because upon return to society and activity the lung does not resume its full function. It converts the positive into a negative case.

If we could close our eyes a little and visualize an Utopia in which all the positive cases were placed behind as formidable a wall as the great wall of China it would only be a few years until tuberculosis, like small pox, would be talked of in the past and one would only see a few sporadic cases.

The surgeon who thinks that by merely unroofing a few centimeters of ribs over a tuberculous lung or by paralyzing a

diaphragm for six weeks he has met the demands imposed upon him by the patient, is far from the truth. The thoracic surgeon is never satisfied, and the case is not complete surgically, until the sputum has become negative. This is the goal and we must keep on until this end is reached even though we start with the least surgical procedure and have to carry on to the more formidable operations, then will we meet the demands put upon us by our patients and society.

Tuberculosis is a disease that kills. It is rare for a patient to cure his tuberculosis by himself, alone. Our high death rate in tuberculosis is proof enough of this fact. If we keep one jump ahead of the tuberculosis, we will cure our patient—one jump behind the tuberculosis, we will kill our patient. The collapse procedure that is indicated at the time of first seeing the patient, is the one that will bring about a steady, increasing diminution of the diseased process.

In one case, we would expect a phrenic to close a cavity, in another, obviously, we would not wait for a phrenic, but start a thoracoplasty immediately.

Indications for Phrenicectomy — A phrenicectomy is indicated in any case in which a pneumothorax is indicated. Obviously, the reverse is not true; we would hesitate in putting a lung down for three years for a progressive lesion the size of a centimeter when a temporary paralysis of the diaphragm with its accompanying rest and compression of the lung might have brought the disease to a favorable termination. By its telescoping action, it may relax sufficiently to collapse cavities with the continuation of pneumothorax. Fifty per cent of the cases which have not reacted to pneumothorax by closure of the cavities, will be closed on the institution of phrenicectomy as an additional measure. The rise of the diaphragm relaxes the apex as much as the base, and it is indicated in upper lobe cavities as well as middle or lower ones, although the results obtained in lower lobe cavities are not as satisfactory due to the mechanics of internal drainage.

Phrenicectomy is indicated in moth-eaten cavities and grape skin cavities. One can expect absolute collapse in over fifty per cent, and definite improvement in thirty-five per cent of this type of case.

Just before a collapsed lung is allowed to expand after a long course of pneumothorax treatment a phrenic paralysis is an insurance policy against reactivation in this lung. The phrenicectomy will decrease the size of the hemithorax to accommodate for the long collapsed lung, and lessen the dangers of tearing open a moderately fibrosing cavity. Approximately eighty per cent of the cavities closed by pneumothorax and the lung allowed to reexpand will break open again upon resuming normal activity within three years.

Indications for Thoracoplasty — This operation is indicated in the chronic, essentially unilateral fibrosing tuberculosis with a rigid mediastinum: the unilateral large open peripheral cavities: pyopneumothorax: cavitation not closed by other means. In acute, rapidly progressing unilateral disease, thoracoplasty may constitute the patient's only chance.

The modern operation of thoracoplasty resects not only the rib close to the transverse process, but should include from one to one and one-half centimeters of the transverse process itself. The rib should be removed by the posterior incision within a centimeter of the costo-chondral junction of the first to the fourth rib inclusive. As a large percentage of cavities are posterior this gives one the greatest collapse possible in the region where it is most needed.

The mortality statistics in thoracoplasty range from five to fifteen per cent depending entirely upon the operator. The surgeon who picks his cases carefully will have a mortality of only five per cent or so, but he will just as surely put as many patients in their graves with pulmonary tuberculosis as the operator whose mortality is fifteen per cent and who takes on a few more four-plus risks, and returns fifty per cent of these cases

back to their homes and society. To attempt these high risks one must have at his command a thoroughly trained operative team and post operative care and have a definite understanding of the normal physiology of the chest coupled with a deep understanding of the pathological conditions encountered and the operative pitfalls that may become manifested at any time. The thoracic surgeon of today should be as conversant with the stethoscope as he is with the scapel.

Indications for Pneumolysis — By partial thoracoplasty is meant the resection of ribs overlying the diseased lung, and resections of three, five and seven ribs may be removed leaving the remainder of a clear lung to carry on with. In this type of operation the diaphragm is rarely paralyzed. In the last few years we have heard a great deal about selective pneumothorax. A partial thoracoplasty is analogous to a selective thoracoplasty.

In the last few years a few bilateral selective thoracoplasties have been done with satisfactory results.

Indications for Plombage — The operation of plombage is indicated in moderate sized cavities with very little peripheral involvement. Bilateral apical cavitation is especially amenable to this procedure if the remainder of the lung fields are fairly normal. The idea of the operation is direct extra pleural compression of a cavity by means of fat, muscle, paraffin, rubber bag, or gauze pack with the rib acting as counter pressure.

Results of Collapse Therapy — With a widespread application of compression therapy to the early suitable case, the number of permanently closed cases should be higher than fifty per cent. In a well regulated sanatorium, where the cases are sent in at an early stage, seventy-five per cent should be under collapse therapy. This will not be true in the old boarding house type of sanatorium.

Tuberculosis is a self-limited disease — by death. Sixty per cent of all open progressive tuberculous cases under sanatorium care proceed to a fatal termination

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Tuberculin Survey of Webster County School Children

IN THE spring of 1934 the County Health Department of Webster County, Missouri, at that time headed by Dr. J. W. Bailey, County Physician and Miss Elnore Hackmann, County Health Nurse, advised with us relative to making a tuberculin survey of all the school children in Webster County. She had the backing of the Parent Teachers Association as well as the good will of practically every citizen in the county. The following offer was made and accepted by the various organizations of the county:

All school children were to receive 1/10 milligram of Old Tuberculin, to be administered by some member of the staff of the Missouri State Sanatorium and 48 hours later was to be read. All positive reactors were to be x-rayed at the institution with a minimal fee of \$1.00. However, before giving any child the test a written consent by the parents was required, this in order to prevent any unpleasant publicity.

The following table gives in a brief manner the immediate results of the test:

	Total	Percent
Number school children in county	4042	
Number tested	3109	
Positive reactors	451	14.5% of positive reactors
Number of x-rays	363	80.5% of number x-rayed
Number active adults judged from x-ray and sedimentation	9	.025%
Number active or semi-active judged from x-ray and sedimentation recommended for check up	111	30.58%
Number active primary judged from x-ray and sedimentation recommended for sanatorium treatment or home rest	14	.084%

I might add at this time that it took the better part of 18 months to make and read the tests and transport these children approximately 60 miles to the institution and get x-rays.

The first thing of interest in regard to the above figures is the whole-hearted co-operation of most of the people. By far the majority of the parents of this

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county were not only willing but anxious to have their children tested. In many instances people brought young children not of school age and even asked for the skin test for themselves. By far the greatest number of refusals came from the uneducated group and in many instances the very people about whom information was most needed.

The next point of interest is the low percentage of positive reactors, which is most likely explained by the fact that this is a rural county and has no town with a population of over 1500. There were 20% of the positive reactors who did not have x-rays. This is probably explained by the fact that we were unable to x-ray all reactors within the first month or two after the skin tests were made. Others had either moved from the county or had changed their mind. It is interesting to note that of the 363 x-rays there were 9 cases of adult pulmonary tuberculosis and only one of whom suspected he had the disease. This means that we discovered 9 active cases who were spreading germs about the community and upon the most potent soil possible, the school children. Of this 9, at least one was a school teacher who was then teaching in her school for the second term. The percentage of reactors in this school were 66% against an average of 14%. In another school where it was known the teacher had died of pulmonary tuberculosis after having taught two terms, the percentage of positive reactors was also over 60%. There were 14 or .084% of this group which was x-rayed who suffered from active primary or childhood tuberculosis as judged from x-ray and sedimentation rate and were recommended for sanatorium or home rest. There were 111 who had either active or semi-active disease

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as judged from x-ray and sedimentation but whose conditions were such that it was not felt necessary to place them on strict bed rest. These cases were recommended to have check ups in from three to twelve months.

Had the information obtained from this survey been put to no other use I am sure the survey would have been well worth while. More information in regard to tuberculosis was probably disseminated in this county during the 18 months of this study than ever before. The people of the county became tuberculosis conscious. The members of the county court who make out the county budget and through whom all expenditures are made have since this time better understood its problems and responsibilities relative to this disease. However, this was not the end. The county health nurse used this information to good advantage and is still keeping in contact with the families who presented children with positive reactions.

As stated above, this tuberculin survey began in the spring of 1934, starting April 1. Records of discovered cases of tuberculosis had been kept in the county since August 1, 1931, and between August 1, 1931 and April 1, 1934, there were 23 cases which had come to the attention of the health department. Practically all of these cases were in the advanced stages and very little, if anything, could be done for them. After April 1, 1934, there were 42 active cases discovered as a direct result of the tuberculin survey. In addition to this there were 24 other cases discovered as an indirect result of the tuberculin test, practically all of whom, the health nurse assures me, would not have been discovered had it not been for this survey. This survey made it easy for the nurse to discuss health problems with the family and in this way found many additional cases of old tuberculous contact which would have been found in no other way. To quote from Miss Hackmann, the county nurse: "I find heretofore families have tried to cover or hide their tuberculosis contacts,

but they are now more open and free to discuss their tuberculous family relations." In answer to a question relative to the value of these tests to her county, Miss Hackmann stated, "No chest clinic in Webster County would have been of as great a value in a case finding survey in my opinion, as tuberculin testing of school children has been".

I do not know the exact figures in dollars and cents, but do know that the entire cost of this survey was not over \$500.00. It is difficult to estimate the value of human lives in dollars and cents and I am not much of a statistician, however, it might be well to think of what it would mean to leave 66 people in a county suffering from adult pulmonary tuberculosis to spread this disease. Certainly from the dollar and cent standpoint it is not a paying proposition to permit these cases to go undiscovered, especially when there are preventable measures at our command.

This problem of eradicating or controlling pulmonary tuberculosis has been a subject of vital interest for the past 50 years. During this time, we have seen a very rapid decrease in the death rate. No doubt a large percent of this decrease is due to the intense educational program of the National Tuberculosis Association and other health agencies. This educational program has been extended, not only to the medical profession, but to the laity and the people at large. Millions of dollars have been spent and no doubt not in vain, however, in spite of all of this wonderful work, tuberculosis still ranks first in the cause of death between the ages of 15 and 45. In spite of the campaign for early diagnosis, 5 out of every 6 patients admitted to the sanatoria in this country are in the advanced stages. There are several reasons for this, the foremost of which are:

1. The patient seldom presents himself to the physician until he is in the advanced stage. In fact the symptoms are often so slight that they may go unnoticed for many days. Even loss of

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Prognosis in Arrested Tuberculosis*

IT HAS been stated by some students of tuberculosis that the most certain thing about the prognosis

of this disease is its uncertainty. Those who have had considerable clinical contact with tuberculous individuals will on the whole subscribe to this viewpoint. Despite this skepticism there are certain tangible facts about tuberculosis that justify one to assume the role of a prognosticator and to predict the end result in a certain patient. Who can deny the clinical fact that a minimal case of tuberculosis has a better chance for recovery than a far advanced one? On the other hand, who can challenge the veracity of the statement that miliary tuberculosis and tuberculosis meningitis are fatal diseases?

In the past decade newer methods of treatment have been sufficiently tried out to enable one to estimate with a certain degree of accuracy their influence on prognosis. The statistical facts to be presented permit one to evaluate the influences of only two older methods of treatment on prognosis; namely, bedrest and pneumothorax treatment.

The writer has for some time been engaged in making follow-up studies on discharged arrested patients from Koch Hospital, the municipal sanatorium for the treatment of tuberculosis. The follow-up work was carried out through the Municipal Visiting Nurses by obtaining the necessary data directly from the patient and by tabulating same on a questionnaire prepared for this purpose. This information was not difficult to obtain since many of our discharged patients are still under clinic supervision. In some instances no information could be obtained since the patients were either lost or had left the city. The Bureau of Vital Statistics was consulted for the purpose of discovering whether any of the lost patients were dead, or whether they were re-reported as

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active by private physicians.

This paper is based on an analysis of the end re-

sults in 398 arrested or apparently healed cases of tuberculosis discharged from Koch Hospital during the years 1923 to 1934—a period of 11 years.

For the sake of clarity the writer desires first to define the term "arrested" disease. The American Sanatorium Association originally adopted a classification in 1909 but since then modifications have been made several times. The most recent pamphlet issued by the National Tuberculosis Association in January 1931, defines arrested disease as follows: All constitutional symptoms absent; sputum, if any, microscopically negative for tubercle bacilli; x-ray findings compatible with a stationary or retrogressive lesion. These conditions shall have existed for a period of six months, during the last two of which the patient has been taking one hour walking exercise twice daily or its equivalent. This definition applies to pulmonary tuberculosis only. The term apparently cured applies to the childhood and bone cases.

All patients discharged as "arrested" from Koch Hospital met the requirements as outlined at that particular time by the National Tuberculosis Association.

The 398 cases followed up consisted of 212 males and 186 females; of these 398 patients, 52 were negroes, 23 of whom were males and 29 females. Although the ages varied from 1 to 74 years, 56% were in the age groups between 15 and 35.

The results of the follow-up study can best be shown in the following tables:

Table 1.
Classification of 398 Patients as to color, type and stage of disease.

	White	Negro	Both	% of Total
Pulmonary				
Minimal	48	9	57	14.3%
Mod. Adv.	111	13	124	31%
Far Adv.	162	13	175	44%
	321	35	356	89.3%
Juvenile or Childhood	8	10	18	4.5%
Extra Pulmonary	17	7	24	6.2%
GRAND TOTAL	346	52	398	100%
	(87%)	(13%)		

*From the Tuberculosis Division of the St. Louis Health Department.

†Chief of Medical Section of the St. Louis Health Department and Assistant Health Commissioner.

Table 2.

End results in 398 arrested or apparently healed cases of tuberculosis discharged from Koch Hospital (white & negro) years 1923-1933

Year	No. Discharged	No. Traced	%	Remained Well	%	Relapsed	%	Died	%
1923	4	2	75	1	33			2	66.66
1924	14	5	37	3	60	1	40		
1925	22	8	36	4	50	1	12.5	3	37.5
1926	30	10	33.33	3	30				
1927	39	16	40	6	37.5	5	31.2	5	31.2
1928	21	11	52	5	45	3	27.5	3	27.5
1929	40	27	67.5	12	44	10	37	5	19
1930	23	15	65	9	60	4	26.5	2	13.5
1931	34	32	94	29	90	3	10		
1932	65	60	92	54	90	5	8	1	2
1933	105	102	96	93	91	6	6	3	3
Total	398	289	72.6	219	76	39	13	31	11

Table 3.

End results in 398 cases according to stage and type of disease

	No.	Traced	Well	%	Working	%	Relapse	%	Died	%
Minimal	57	28	25	89	26	80	2	7	1	4
Mod. Adv.	124	69	49	71	27	55	11	16	9	13
Far Adv.	175	160	117	73	59	50	25	18	18	11
Extra Pulmonary	24	14	10	71	3	30	1	8	3	21
Juvenile or Childhood	18	18	18	100	14	77				
	398	289	219	76	123	56	39	13	31	11

Table 4.

INFLUENCE OF PNEUMOTHORAX ON PROGNOSIS

Number of Patients discharged during 1931, 1932 and 1933 1934

	No. Remained Well	%	Relapse	%	Died	%
Number with Pneumothorax	57	53	93	4	1	0
Number without	137	123	90	10	7	4

Table 5.

Follow-up of 52 arrested negro patients (M 23, F 29)

Year	Total Discharged	Traced	Remained Well	Work or School	Relapse	Dead
1925	1 hip case	1			1	
1926	4					
1927	3	3	1		1	1
1928	1					
1929	9	4	2	2	1	
1930	2	2	2			
1931	2	2	1	1		
1932	9	8	4	4	1	
1933	21	19	19	13		
Total	52	39	34	20	4	1

Table 6.

Comparative end results white and negro cases

	Total No. Discharged	Traced	%	Well	%	Working or School	%	Relapse	%	Dead	%
White	346	250	72	185	73	103	55	35	14	30	13
Negro	52	39	75	34	87	20	50	4	11	1	2
Total	398	289	72.6	219	76	123	56	39	13	31	11

Discussion

A more detailed study of the foregoing figures reveals many interesting facts deserving comment. It will be noticed that approximately 76% of the cases discharged from Koch Hospital as arrested have remained well, 13% relapsed and that only 11% died. In attempting to evaluate and compare these results with those obtained from other sanatoria, the writer was amazed to find that, despite the voluminous literature which exists on almost any phase of experimental and clinical tuberculosis, only very meager information is available in regard to follow-up studies on discharged sanatorium tuberculous patients and that practically no information could be obtained in regard to end results in discharged arrested cases. The studies made by Dublin¹ in 1929, Whitney and Myers² in 1930 are not in the same category with this study since the former included all types of discharged cases in their investigations, such as unimproved, improved, quiescent and a small number of arrested cases, while this study concerns itself with arrested cases only. Furthermore their objective was to determine the per cent of living patients at the end of a certain period, while our objective was to find the per cent of well patients at the end of a certain period.

A pamphlet issued in January, 1933 by the National Tuberculosis Association entitled, "What Happens to Patients Discharged From Tuberculosis Sanatoria" and written by William F. Lawrence³ of the Statistical Department, is of some comparative interest. Lawrence reports a follow-up study by questionnaire of 238 discharged cases from Massachusetts sanatoria during 1928. In his group he includes all types of cases of which 32 were arrested. He found that at the end of three years 32% of all his cases were dead, 19% of the arrested cases had relapsed, and that 3% of the arrested cases were dead.

A further analysis of the statistical data as revealed in table two indicates in a general way that the per cent of those

who have recovered is inversely proportional to the lapse of time since discharge from the institution, or, in other words, the per cent of those who have relapsed or died is directly proportional to the lapse of time since discharge from the institution.

That early diagnosis is the keystone to successful treatment and ultimate recovery from the disease, follows from the fact that of the minimal group 89% remained well and of these, 80% were working as compared with 73% and 50% respectively of the advanced group. It is of interest to mention in this connection that the average residence in the sanatorium of the minimal, moderately advanced and far advanced cases before obtaining an arrestment of their disease was 528, 554 and 929 days respectively.

As to the effect of pneumothorax on prognosis, the figures are self-explanatory. All pneumothorax cases with the exception of one, were discharged in the past three years, and during the same three years, 137 were discharged without having received pneumothorax treatments. When we bear in mind the fact that the cases which were given pneumothorax treatments were mostly those who did not respond to bedrest treatment and were of the far advanced group (49 out of 57), the favorable influence of pneumothorax on prognosis can best be appreciated.

An interesting group to study is the discharged negro patients. For a long time it has been the belief of many students of the problem that negroes offer no resistance to the disease and that the lesion in the negro is generally a progressive one leading to a fatal end. Contrary to our expectations, the results in the negro group were almost incredible and caused us to revisit the negro patients and to recheck our statistics thereby confirming the original surprising but pleasant findings. The results obtained in the 52 negroes are most encouraging and challenge the former theories. These follow-up studies indicate that given the benefit of early diag-

nosis and proper treatment the negro can respond to treatment and can recover from this disease.

Conclusions

In conclusion the writer wishes to point out that there are 5 definite facts which stand out as a result of this study.

1. Bedrest is an effective method of treatment since 74% of those who remained well received this form of treatment only.

2. Collapse therapy, and specifically pneumothorax therapy, favorably influences the prognosis in pulmonary tuberculosis.

3. The chance for life of the tuberculous patient is directly dependent upon the stage at which the disease is discovered. Patients with minimal disease get well sooner and live longer than those with far advanced disease.

4. Most children with childhood tuberculosis recover from their disease.

5th and last: Negroes, when given the benefit of early diagnosis and proper treatment, can recover from tuberculosis.

It is gratifying to find that many of the patients who have fought the tedious and prolonged battle with this old enemy of society have recovered and have continued to remain well. In as much as *TIME* is the best indicator of the effectiveness of any method of treatment the only positive evidence of the efficiency of any treatment is the living patient, clinically well, socially free, and economically self-reliant.

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(A National Association of Private Sanatoria and Chest Specialists)

COTTON AVENUE AND WYOMING STREET

EL PASO, TEXAS

May 1, 1936.

Gentlemen:

This is the fifth in a series of open letters addressed to physicians and welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

The Metropolitan Life Insurance Company maintains a sanatorium at Mount McGregor, New York, for the private care of their tuberculous employees. Other organizations have entered into agreements with existing private sanatoria to provide sanatorium care for their tuberculous members.

The sanatoria listed below are the finest private sanatoria in the United States and are equipped to administer the best of medical care and treatment. Permit us to acquaint you with the facilities now available in these institutions for the care of your employees or your members who are afflicted with tuberculosis.

For further details please address the Committee on Economics of the Federation of American Sanatoria at the above address.

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COMMITTEE ON ECONOMICS

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Missouri State Sanatorium

Mount Vernon, Missouri

The above picture is that of the new Medical Center at the Missouri State Sanatorium which will be completed in the early part of 1937. The institution is located at Mount Vernon and was opened August 17, 1907, with a capacity for twenty-four tuberculous patients. Today the Missouri State Sanatorium has ten major buildings for patients with a capacity of 505 beds, including a fifty bed preventorium for children and twenty-four beds for colored patients. Prior to 1925 the institution had been conducted more or less on the scale of a rest camp, the construction of the sanatorium having been patterned similar to the Saranac Cottage plan, but today every known and proven advanced method of treatment is available for those patients admitted. More than 10,000 patients have been treated in the institution since its establishment. Dr. W. J. Bryan is the superintendent and medical director and is assisted by six resident physicians, a steward, thirteen graduate nurses, fifty practical nurses and orderlies, a dietician, an x-ray technician and a full time laboratory technician. The daily per capita cost during 1935 amounted to \$1.64. In addition to the splendid work of the sanatorium, an out-patient department is maintained and members of the staff frequently cooperate with school boards throughout the surrounding communities by conducting health clinics and by giving school children the tuberculin test. Plans are under way for the erection of a new infirmary ward which will have a modern medical and surgical unit built in connection.

36

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Looking toward the main building, with the Women's Building (left) and the Men's Building (right)

Robert Koch Hospital

BY

G. D. KETTELKAMP, M.D.
Superintendent

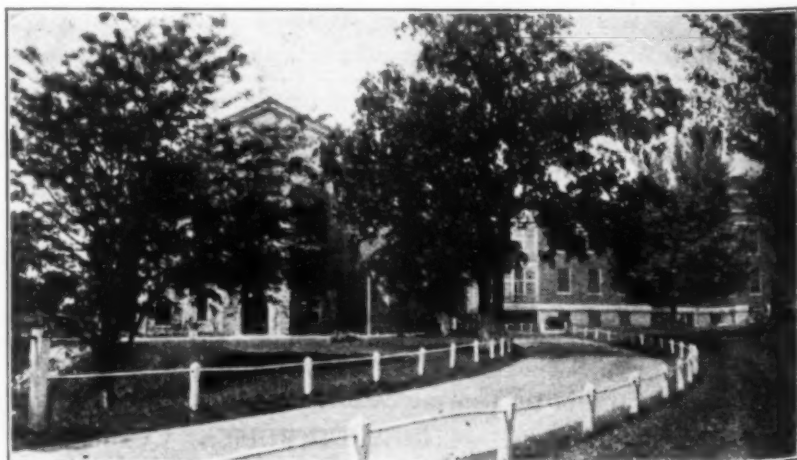
Robert Koch Hospital, an institution owned and operated by the City of St. Louis for the care of its citizens afflicted with tuberculosis, is located on the west bank of the Mississippi River about two miles south of Jefferson Barracks, and about fifteen miles south of the business section of St. Louis. It is on one of the main lines of the Missouri Pacific Railroad. The postoffice is known as Koch, Missouri. The location is one unusually well adapted to the treatment of tuberculosis. Away from the disadvantages of the large city it is at the same time near enough so that by means of the excellent all-weather roads the city's advantages are sufficiently easy of access. The scenery centered about the old Mississippi is very inspiring and conducive to a life of thoughtful relaxation, an advantage inestimably valuable to one who must lay aside life's worries and hustle and bustle for an extended period in his quest of health.

The history of the institution is very interesting. However, space will permit only a very brief historical sketch. Anyone interested in more detail is referred to the June, 1935, number of the "Koch Messenger" published by the patients of Koch Hospital.

In June 1854, the City of St. Louis purchased 64 acres of the present 169 acres, and established a quarantine station for infectious diseases. In those days, yellow fever, cholera, and smallpox were terrible scourges, and many unfortunate victims of these diseases lost their lives at the Quarantine Station in those early days. Since practically the only communication into and out of the city of St. Louis was by river traffic and trails, most people entering the city came by boats from New Orleans and the South. These boats could

be stopped here and the crew and passengers quarantined long enough to determine whether or not these infectious diseases were aboard. Some lepers were also quarantined here.

By 1910 sanitary measures against contaminated food and water supplies in case of cholera, proper screening of the mosquito in case of yellow fever, and vaccination in case of smallpox, had almost eliminated these diseases, but the need for the isolation of tuberculosis patients had by that time become very evident. Consequently, in that year the first patients with tuberculosis were isolated here and the name changed to Robert Koch Hospital, in honor of the eminent Dr. Robert Koch of Germany. However, in these early years Koch Hospital served primarily as a place of isolation, and not much was expected in the way of treatment for tuberculosis. In 1922 a bond issue was voted by the City of St. Louis to add several necessary buildings, and along with the propaganda which resulted in the bond issue, came also the development in the institution and better regulations and regime for the treatment of tuberculosis.



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Kansas City Municipal Hospital

BY
MISS MERLE WALKER, R. N.
Superintendent

In 1906, the City Council of Kansas City, Missouri, first realized the need of special care for tuberculous patients, and effected plans for organized treatment of the disease.

In 1908, the Jackson County Society for relief, prevention and control of tuberculosis was formed. Mr. Frank P. Walsh, prominent lawyer of Kansas City and Washington, was first president. In 1909, through his efforts, the National Tuberculosis Association Exhibit was brought to Kansas City. Forty-five thousand people attended, which brought to the attention of the authorities the fact that people felt the need of the proposed institution and it gave them courage to proceed and submit the bond issue for the first building.

The building was begun in 1914 and was built by the prisoners of the Municipal Farm thus cutting the cost of construction to a minimum. The erection of the building was slow owing to the fact that so much of the labor, although properly supervised, was that of unskilled men. The winding road leading from the highway below was cut from the cliffs by axes, picks and shovels.

The institution is located on a fifteen acre tract of ground—a part of the Municipal Farm—about seven miles from the downtown district of Kansas City. The buildings are situated on the top of a hill, which rises two hundred feet above the U. S. Highway No. 40. The grounds surrounding the buildings are of varied character, lending charm and diversity to the general landscape. Kansas City presents a beautiful picture viewed from the hospital.

On Christmas day, 1915, the building was opened with eighteen patients as inmates. The furnishing of the building took place as rapidly as possible. The first ward opened in what is now called East 1, which is the first floor of the east wing and was for the men patients only. The next ward was what is now called West 1; this ward took care of the women patients.

Kansas City has been most fortunate in always having as Members of its Health Department, men and women deeply interested in the study and care of tuberculosis, notable among whom was Dr. E. W. Schaufli, one of Kansas City's oldest and best loved physicians. He was one of the group who started the first tuberculosis campaign in 1908 and remained active in the work until his death on October 29, 1916. There were also Mr. Tom Flinn, at one time president of the board of health; Dr. W. L. Gist, formerly superintendent of the Kansas City Municipal general Hospital; Dr. Paul Papuin, who at one

time operated the Asheville-Biltmore Tuberculosis Hospital at Asheville, North Carolina. It was through the enthusiasm of Dr. Papuin that Dr. Gist became interested and was able to do so much for the situation in Kansas City. Dr. Kerwin Kinard, Dr. Frank Hurwitt, Dr. Sam Snider, Dr. Herbert Mantz, Dr. George Lee and Dr. W. A. German, have all been Medical Directors of the sanatorium at Leeds.

In 1925 a bond issue was voted in Kansas City, out of which \$150,000 was available for the tuberculosis hospital, and in 1929 a new building was erected for negroes, thus increasing the capacity of the beds to 161.

The Kansas City Municipal Tuberculosis Hospital is financed and maintained by the tax payers of Kansas City, Missouri, and only residents of Kansas City are eligible as patients.

Dr. Edwin Henry Schorer, Director of Health for Kansas City, Missouri, is deeply interested in tuberculosis work, and has been untiring in his efforts to make this sanatorium the best in the country.

The Kansas City Municipal Tuberculosis Hospital is fortunate in having the entire staff of the Kansas City Municipal General Hospital as consultants. They are all outstanding men in the Medical Profession and Members of the Jackson County Medical Society, who give gladly and unstintingly of their time and skill to this cause.

Dr. W. W. Buckingham, who is serving as Medical Director of the sanatorium, graduated from the University of Pennsylvania, interned at St. Luke's hospital in Kansas City and then returned to Philadelphia for one year of post graduate work in surgery. He then went as instructor in Thoracic Surgery to the University of Michigan Hospital and Medical School, where he received his training in tuberculosis, stressing particularly surgical collapse measures.

In 1934-35 approximately \$180,000 was issued under the ten year plan for the Kansas City Municipal Tuberculosis Hospital.

With the money available a surgical pavilion was built, considerable reconstruction was done, and many improvements of different departments were made and the whole hospital was equipped with the most modern devices and furniture, thus increasing the capacity from 168 beds to 260.

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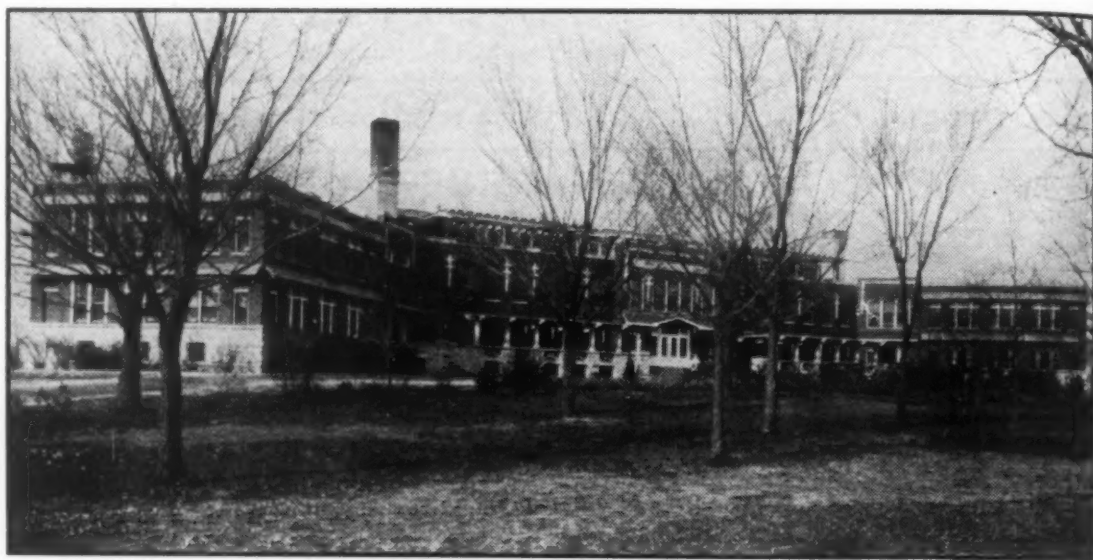
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Jasper County Tuberculosis Hospital *Webb City, Missouri*

BY

JESSE E. DOUGLASS, M.D.
Superintendent

The Missouri State Legislature in 1915 enacted a Law entitled "Tuberculosis Hospital Bonds; Establishment of Tuberculosis Hospitals", whereby any county could issue bonds for the erection of a tuberculosis hospital and further stipulated that the State of Missouri would furnish financial aid towards its maintenance by paying to the County Court \$5.00 per week for each county patient. The direction and management of these hospitals was to be vested in a Board of Tuberculosis Hospital Commissioners of five members to be appointed by the County Court.

Pursuant of this enactment, the Jasper County Court, following a proper vote of the residents of the county, issued bonds for \$100,000 to erect the Jasper County Tuberculosis Hospital. This hospital is built of brick, stone and concrete construction to accommodate one hundred patients. It is located one and a half miles northwest of Webb City on a forty-acre tract of land which was donated by Mr. James A. Daugherty to the Jasper County Court.

The State Legislature in 1925 amended the original law and provided for an increase in State Aid funds from \$5.00 per week to \$12.50 per week for each indigent patient and further provided that any county in the State of Missouri could maintain patients in the Jasper County Tuberculosis Hospital. At the present time the Hospital Bonds have been paid and there is no outstanding indebtedness against the Hospital except the current monthly bills.

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THE USE OF THE TUBERCULIN TEST IN PRIVATE PRACTICE (Continued from page 13)
detect active cases among their adult contacts.

Active pulmonary disease rarely appears before puberty. Children infected before or during puberty are very liable to develop active disease during teen ages, so should be watched carefully. Tuberc-

culin tests show us the ones to watch.

Tuberculin tests in adult groups save x-ray films and allow attention to be focused on patients who are known to harbor tubercle bacilli. Routine films made of these patients will reveal many cases of active disease before symptoms develop.

COMPLICATIONS IN PULMONARY TUBERCULOSIS (Continued from page 10)

disposing factor that has weakened the bronchial walls resulting in bronchiectasis. Pulmonary tuberculosis is often associated with this disease.

Recent investigations have shown that atelectasis of an entire lobe or part of a lobe of the lung rather frequently results from pulmonary tuberculosis. The displacement of the mediastinum usually gives the clue to the diagnosis.

Fistulae in ano are frequently associated with pulmonary tuberculosis. Our investigations have shown that often with an acute flare up of a chronic fistula there is an associated exacerbation of the lung condition. Some authors think that a chronic fistulous tract acts as an immunizer which holds in abeyance the lung condition. They think that explains why lung conditions sometimes progress more rapidly after the fistula has been healed by surgery. There is much room for debate on this point, however. One point I desire very much to leave with you is, *never treat a patient's fistula without examining his lungs thoroughly.*

So called cold abscesses in the chest wall should always remind one of an associated pulmonary tuberculosis and we should never fail to look for it. Though the exact etiology of these abscesses may be debatable, this does not detract from their being an indicator of a possible pulmonary tuberculosis.

Ulcerations of the buccal mucous membrane occur much less frequently than one would expect when one considers the great number of tubercle bacilli constantly passing over them. They are almost always secondary to a pulmonary tuberculosis and give an unfavorable

prognosis. Ultraviolet or x-ray therapy may be beneficial.

Myocarditis, pericarditis, phlebitis, otitis, amyloidosis and other complications could be discussed at length did time permit, but since it does not, a mere mention of these must suffice.

Before closing, however, I wish to say a few words about haemoptysis which really should be considered a symptom rather than a complication. A hemorrhage from the lung may be caused by many things other than pulmonary tuberculosis but it is such a common symptom of this that one should never dismiss the possibility until he has proven another source of the haemoptysis or proven that tuberculosis is absent.

Various drugs are recommended for haemoptysis, most of which are of doubtful value. Sedatives should be given to quiet the patient's anxiety but morphine must be used with great caution as its extreme depressing effect allows too much of an opportunity for tubercle bacillus laden sputum or blood to spread the disease to other parts of the lungs. When it can be accomplished, pneumothorax is our best weapon against hemorrhage. Phrenic paralysis or a partial or complete thoracoplasty may succeed if the patient's condition warrants these procedures.

Permit me to close with this statement, that although there are valuable methods of treatment for many of the above mentioned conditions, the most important treatment for most of the complications of pulmonary tuberculosis is the treatment for the pulmonary tuberculosis itself.

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SURGERY IN PULMONARY TUBERCULOSIS . . . (Continued from page 19)

within five years. A patient who, at the beginning of his sanatorium treatment, has a cavity the size of a cherry which does not show a tendency to heal has only a twenty per cent chance of being alive at the end of six years of sanatorium treatment.

A patient with a phrenicectomy has over a fifty percent chance of a permanent cure; an eighty-five per cent chance of a cure or marked improvement. A patient with a thoracoplasty has a seventy-five to eighty per cent chance of a permanent cure. Forty to fifty per cent of the failures of pneumothorax due to adhesions, are suitable for severance by the cautery.

Conclusions

The idea of surgical treatment of pulmonary tuberculosis has been forced to justify itself in a more or less constant struggle against ultra-conservatism. To justify itself at all, the newer conception

of surgical collapse has been forced to prove itself almost exclusively upon the comparatively hopeless, far advanced case. It is only in the last few years that a few of the braver phthisiologists have given us their early hopeful cases to collapse, with gratifying results to all concerned. Nevertheless, in unusually far-advanced cases surgical collapse has consistently given evidence of better results than those achieved with expectant treatment in parallel cases.

In the future, with our fuller knowledge of technical considerations and deep understandings of pathology and physiology, and more thorough means of diagnosing the early case, we may look forward to an era in which the results will be uniformly more gratifying.

Early diagnosis plus early institution of collapse measures, equals early cure.

TUBERCULIN SURVEY OF WEBSTER COUNTY SCHOOL CHILDREN . . . (Continued from page 21)

weight, fatigue, cough and expectoration may be quite noticeable to friends before the patient complains.

2. The physician often does not suspect tuberculosis even when some rather self evident symptoms are present and even when he does suspect it, may not find physical signs sufficient to warrant a diagnosis without an x-ray, which, in many instances, can not be properly interpreted.

3. Even when the x-ray is advised, the patient cannot afford to have it taken and certainly the physician can not stand the expense. All of which brings us up against the problem of "how are we going to find these cases in the early stages". Certainly we are not doing the job under the old methods. The answer is through our schools and school teachers.

This county having only one full time county health nurse and no full time

health officer, she had many other duties to perform and could not give all of her time to follow up work. I am sure if all of her time for the past two years had been given to following up this survey and visiting each and every home, instead of 66 new cases in two years, she would have easily doubled this number.

If, in turn, each county of our state would institute a yearly check up of their school children and follow up the positive reactors, it would not be long until our death rate would dwindle to almost nothing. It is true that such follow ups cost money but the reduction in the care of new cases would more than offset the money spent in finding them, and, not until the people wake up to the fact that tuberculosis is a preventable and controllable contagious disease when properly handled will this disease be eradicated.

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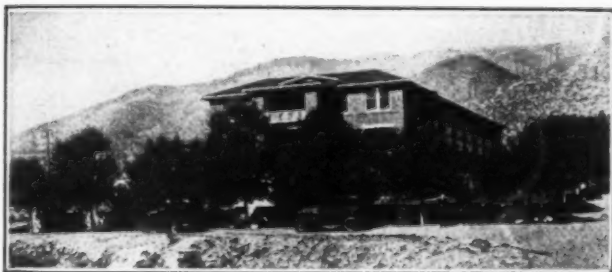
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PRIMARY CARCINOMA OF THE LUNG (Continued from page 16)

time of the report. Numerous other reports are given, but the frequency of recurrence of the growth is discouraging. Total removal of a lung because of carcinoma of the bronchus was done first by Graham (2) April 5, 1933. In addition to removal of the lung and many mediastinal lymph glands, the 3rd to 9th ribs inclusive were removed. This was a left lung. Recent reports indicate the patient continues to do nicely. Rienhoff (7) has given a report of the successful removal of the left lung for tumor in two cases. His report also appeared in 1933.

Overholt (8) reports the successful removal of the right lung for carcinoma which is the first successful right pneumonectomy for cancer to be reported. His operation was done November 13, 1933. Overholt (9) has recently reported a series of 8 pneumonectomies, six of which were for carcinoma of the lung. Three of these survived the operation. A follow up of the first patient operated found her to be in good health.

It seems logical that the prognosis may be better after successful total pneumonectomy than it has proven to be in the cases of lobectomy which have been followed for a longer period of time. In doing a lobectomy, it is not possible to so completely remove the regional lymph glands, and often the tumor mass extends up into the primary bronchus so that it cannot be completely removed. Edwards (3) has been quoted in this regard and C. I. Allen (1) reports a case where lobectomy was performed and there was

a recurrence in the bronchial stub. Radium was implanted and growth of the tumor has been arrested but the tumor persists. The operation was performed in June, 1930. The report is made four years after the operation and clinically the patient is free from symptoms. Allen's case demonstrates the value of combined radium and surgical treatment of carcinoma of the lung.

Conclusions

1. More interest is being shown in the clinical features of carcinoma of the lung.
2. The number of cases of cancer of the lung diagnosed has greatly increased.
3. Carcinoma of the lung has often been confused with pulmonary tuberculosis and lung abscess; at times it is confused with other acute or chronic chest disease.
4. There have recently been reports of successful treatment of carcinoma of the lung by surgery and radium.

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